CHAPTER 1
INTRODUCTION

This document provides guidance for conducting site inspections (SIs) under CERCLA. Data collection requirements for these investigations are consistent with data needed for the revised Hazard Ranking System (HRS). This guidance discusses how to review and evaluate available information, plan an effective sampling strategy to acquire analytical data to evaluate a site according to the HRS, and prepare required reports and work products. Outlines and examples of completed work products are provided to illustrate content and length. This guidance will help investigators conduct efficient, high quality SIs that result in correct site recommendations on a nationally consistent basis.

The objective of an SI is to gather information to support a site decision regarding the need for further Superfund action. The SI is not a study of the full extent of contamination at a site or a risk assessment. The appropriate level of information gathered and analyzed to meet this objective can only be achieved through strategic planning to determine what data are essential to the decision.

The SI phase of the Superfund program is a dynamic, flexible process that should be tailored to the specific circumstances of individual sites; it is not a standardized process to be repeated at every site. The SI investigator, in coordination with EPA Regional and State officials, is responsible for the design and execution of the SI, and should determine how best to use the flexibility of this process. As conditions are tested and hypotheses are either confirmed or rejected, the investigation should be adjusted. These adjustments, like the site decision itself, involve balancing a wide variety of factors and exercising professional judgment.

This document contains six chapters:

- **Chapter 1: Introduction** provides background on the purpose and implementation of Superfund legislation, discusses the structure of the site assessment process, and provides specific details on the role of the preliminary assessment (PA) and SI in the site assessment process.

- **Chapter 2: SI Approaches** discusses the objectives, purpose, and scope of the SI, and provides guidelines for selecting the approach to investigate a site.

- **Chapter 3: Planning** provides an overview of sampling and analysis considerations and HRS analytical data requirements, discusses the importance of available data in developing SI plans, and provides guidelines for reviewing analytical data for SI planning.

- **Chapter 4: Sampling Strategies** discusses sampling principles to investigate site-specific conditions, test PA hypotheses, and document HRS information; presents sampling strategies for each pathway and for multiple pathways; and provides examples illustrating sampling strategies.

- **Chapter 5: SI Evaluation** addresses how to interpret and apply analytical data and non-sampling information.

- **Chapter 6: Reporting Requirements** discusses guidelines for preparing SI work products to report results, provides a detailed outline of a standard SI narrative report, and presents procedures for reviewing SI scores and documents.

Separate EPA documents provide key direction to implement the HRS and should be consulted as supplemental references:

- *Guidance for Performing Preliminary Assessments Under CERCLA* (OSWER Directive 9345.0-01A, September 1991) provides guidance for conducting the PA, including PA evaluation and the use of PA scoresheets.

- *Site Assessment Information Directory (SAID),* 1991, is a directory of information sources for use in site investigations.

- *Hazard Ranking System (HRS) Guidance Manual* (OSWER Directive 9345.1-07, in development) provides guidance for scoring sites and discusses important HRS concepts.

- *Management of Investigation-Derived Wastes During Site Inspections*. (OERR Directive 9345.3-02, May 1991) presents general regulatory information and options to manage investigation-derived wastes (IDW) generated during Sis.

- *Guidance for Data Useability in Site Assessment* (OSWER Directive 9345.1-05, in development) provides guidance on how to collect and apply analytical data to support HRS scoring.

- *Superfund Removal Procedures Manual* (OSWER Directive 9360.3-01, December 1990) provides guidance on daily activities at removal sites. The manual consists of guidance documents on the following topics: Action Memorandum preparation, removal reporting, response management, removal enforcement for On-Scene Coordinators, public participation, removal decisions, special circumstances, consideration of ARARs, and State participation.

CERCLA, as amended by SARA, required certain revisions to the National Oil and Hazardous Substances Contingency Plan (NCP) (40 CFR Part 300, March 1990) to implement the new authorities and responsibilities of the CERCLA amendments. The revisions to the NCP establish assessment programs to investigate releases:

- Section 300.410 establishes a phased investigation approach to.address potential emergency response or removal situations, consisting of a removal preliminary assessment (PA) and a removal site inspection (SI) to evaluate whether a removal action is appropriate.

- Section 300.420 specifies the site assessment process—known as the preremedial process—which designates sites that qualify as priorities for long-term remedial evaluation and response. The process consists of a remedial PA (Section 300.420 (b)) and a remedial SI (Section 300.420 (c)).

The subject of this document is site evaluation within the site assessment process, and unless specifically identified as activities in the removal assessment process, PAs and SIs described in this guidance are the PAs and SIs specified under NCP Section 300.420.

1.1 SITE ASSESSMENT PROCESS

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) establishing the Superfund program to respond to releases and threatened releases of hazardous substances. CERCLA Section 105 required EPA to establish criteria for determining priorities among releases or threatened releases of hazardous substances for the purpose of taking remedial action. To meet this requirement, EPA developed the HRS (47 FR 31180, July 16, 1982) to evaluate sites for the National Priorities List (NPL). Sites on the NPL are eligible for Federally funded remedial action.

The Superfund Amendments and Reauthorization Act (SARA) of 1986 required EPA to revise the HRS to more accurately "assess the relative degree of risk to human health and the environment posed by sites." SARA also required the HRS to take into account recreational use of surface waters, contamination of the human food chain and drinking water supplies, and potential contamination of ambient air. EPA published the revised HRS on December 14, 1990 (55 FR 51532).

The site assessment process begins with site discovery, or notification to EPA of possible releases of hazardous substances. All sites are entered into CERCLIS, EPA's computerized inventory of potential hazardous waste sites. EPA then evaluates the sites using a phased investigation consisting of the PA and,

if necessary, the SI. The PA is a limited scope investigation based primarily on available information and performed by EPA or States for every CERCLIS site. The PA distinguishes sites that pose no threat to human health and the environment from sites that may pose a significant threat. Sites that may pose a threat receive a further action recommendation after the PA and undergo an SI, where investigators collect sufficient waste and environmental media samples to identify sites that have a high probability of qualifying for the NPL.

When the PA and SI are completed, EPA calculates the HRS site score and either recommends further investigation and possible proposal to the NPL or makes a "Site Evaluation Accomplished" (SEA) determination. A SEA recommendation drops the site from further Federal Superfund consideration; however, the removal program may continue to address threats and any site may be reassessed if new information becomes available. Information for dropped sites is provided to States or other regulatory authorities, which may take action on their own. If no statutory provision or EPA policy indicates dig the site should not be listed on the NPL, a site with an HRS score of 28.50 or greater is eligible for the NPL. These step— discovery and entry into CERCLIS, PA, SI, HRS package preparation, and listing—make up the site assessment phase of the Superfund process (Figure 1-1). The remaining steps in the Superfund process are the remedial investigation/feasibility study RI/FS), Record of Decision (ROD), remedial design/ remedial action (RD/RA), and operation and maintenance (O&M) (Figure 1-2). Under Superfund's removal authority, the RI may start at any time during the site assessment. The RA for Fund-lead sites, however, can begin only after a site is on the NPL.

> The "Site Evaluation Accomplished" (SEA) recommendation replaced the "No Further Remedial Action Planned" (NFRAP) recommendation (see Henry Longest Memorandum, May 11, 1992). A SEA recommendation denotes that, to the best of its knowledge, EPA has completed its assessment at a site and has determined that no further steps to list the site on the NPL will be taken unless information indicating that this decision was not appropriate make a recommendation for listing appropriate at a later time. The CERCLIS qualifier remains "N" as it was for NFRAP. The "NFA" indicator in the CERCLIS List.8 Report was changed to "SEA."

Sites placed on the NPL are subject to further investigation during the remedial phase. The objective of the remedial phase is to eliminate, reduce, or otherwise control risks to human health and the environment. The steps for selection and implementation of a remedy include the remedial investigation, feasibility study, record of decision, remedial design, and remedial action.

At any time during the site assessment process, conditions at the site may warrant removal actions. Removal actions, as defined in CERCLA Section 104,

FIGURE 1-1: SITE ASSESSMENT IN SUPERFUND

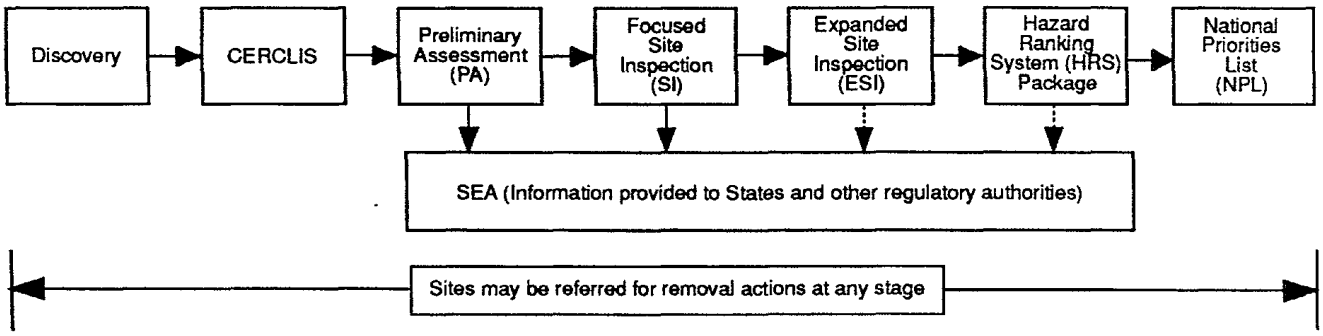
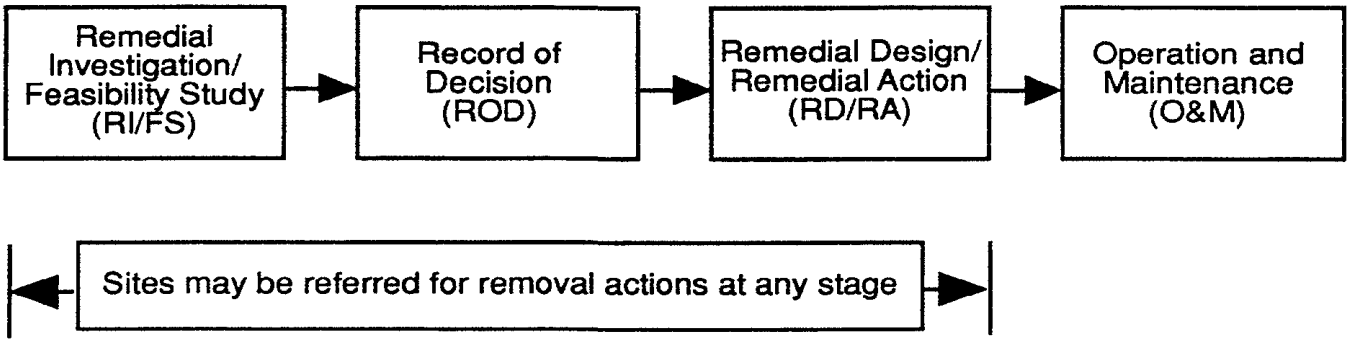


FIGURE 1-2: THE REMEDIAL PHASE OF SUPERFUND



are actions taken to eliminate, control, or otherwise mitigate a threat posed to public health or the environment due to a release or threatened release of hazardous substances.

EPA has developed a new model for streamlining and accelerating the Superfund program, the Superfund Accelerated Cleanup Model (SACM) (OSWER Directives 9203.1-01, April 7, 1992 and 9203.1-03, July 7, 1992). SACM includes an integrated approach for site assessment. SACM implementation will change the structure and goals of the SI, but the content of the data collected will not change. The principles of site assessment and the concept of the focused SI contained in this document are quite consistent with SACM.

1.1.1 Preliminary Assessment

The PA distinguishes sites that pose little or no potential threat to human health and the environment from sites that warrant further investigation. The PA also fulfills public information needs and supports emergency response and removal activities by providing specific background information.

> The primary objective of the remedial site assessment program is to obtain enough data to evaluate sites under the HRS and identify those that should be on the NPL. The revised HRS requires more data than the original HRS, and the site assessment process has been restructured to balance the need to accurately assess site conditions with the need to conserve resources.

The PA is a relatively quick, low-cost compilation of readily available information about the site and its surroundings. The PA emphasizes identifying populations and other targets that might be affected by the site. It includes a reconnaissance of the site and its surrounding environment but not sampling. The simplified approach used for the PA examines key HRS indicator factors that can be evaluated within the limited scope of the PA. Factors that are not critical to the score use reasonable default values and truncated evaluations.

The PA provides information on:

- Historical waste generation and disposal practices
- Hazardous substances associated with the site
- Potential sources of hazardous substances
- Important migration pathways and affected media
- A comprehensive survey of targets
- Critical sample locations for the SI

PA scoresheets identify critical HRS factors and provide instruction for their evaluation. Professional judgments made during the PA form the foundation for hypotheses that are tested during the SI.

Data important to the HRS may not be available during the PA—for example, analytical data on

hazardous substance releases and targets exposed to actual contamination. For these factors, the site investigator exercises professional judgment applied in a reasonable and consistent manner to form hypotheses regarding the likelihood of release of hazardous substances and their migration to targets.

1.1.2 Site Inspection

Generally, the SI is the first investigation to collect and analyze waste and environmental samples to support a site evaluation according to the HRS. SI sample locations are strategically planned to identify the substances present, determine whether hazardous substances are being released to the environment, and determine whether hazardous substances have impacted specific targets. At the end of the SI, the investigator submits findings to EPA Regional and State officials who decide whether the site should undergo further investigation (resulting in possible NPL placement) or be dropped from further Federal Superfund consideration.

PA recommendations for further investigation may be based on a suspected threat without analytical documentation, since field samples are not taken. If, after sampling to test PA hypotheses, the site is found to present no significant threats to human health or the environment, the SI serves as a second screening investigation.

When initial site samples verify some or all PA hypotheses, or other data indicate the site poses a sufficient threat to warrant NPL consideration, the SI must be comprehensive and support HRS package preparation.

Often the scope of an SI can be limited to screening the site to confirm that it has no reasonable chance for placement on the NPL. A few strategically located samples may be enough to indicate that no further Superfund action needs to be planned. In such a case, collecting all information needed for HRS scoring is unnecessary. Instead, if critical questions remain after the PA regarding contamination that a few strategically placed samples could answer, the SI investigator can efficiently focus on those questions to determine how serious the threat posed by the site may be. This guidance manual refers to this type of SI as a focused SI.

At some sites, source, release, and target contamination are known during the PA from previous sampling investigations. Samples that focus on identifying substances and critical contamination to screen the site are not necessary. Instead, the scope of the SI is expanded to fully characterize the most significant threats posed by the site. An expanded SI should not result in a SEA recommendation; the option to perform an expanded SI should be reserved for sites that appear to qualify for the NPL.

An efficient way to fulfill both the screening and listing functions of the SI is to conduct the investigation in two parts: as screening (focused SI) and follow up, larger scale (expanded SI) investigations. Alternatively, the focused SI may collect enough information to document the HRS evaluation. And, as a final option, a single SI, generally expanded in scope, may satisfy HRS requirements without a screening stage.

Generally, the focused SI allows the investigator to determine if the site qualifies for the NPL or to support a SEA recommendation by testing PA hypotheses. It may be possible to prepare the HRS scoring package after the focused SI. However, most sites that are proposed for the NPL will require an expanded SI to complete sample and data collection to support an HRS package. Chapter 2 provides guidance on selecting an SI approach.

The SI consists of four major activities:

1) Review available information, including analytical data.
2) Organize project team and develop SI work plan, sample plan, health and safety plan, and investigation-derived wastes (IDW) plan.
3) Perform field work to visually inspect the site and collect samples.
4) Evaluate all data and prepare the SI report.

For some sites, the SI may involve additional tasks to help meet SI objectives and support HRS data requirements and emergency response and remedial efforts (see *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, OSWER Directive 9355.3-01).

National Contingency Plan (NCP) Section 300.420(c) (55 FR 8845) establishes two primary goals for the SI:

- To collect additional data to evaluate sites using the HRS, and
- To screen out sites that will not score high enough for the NPL.

Other SI goals are to support potential removal or enforcement actions and to collect data to support the remedial investigation and feasibility study (if the site is subsequently placed on the NPL) or response action under other authorities.

Review Available Information

Before developing SI plans, the investigator should review results from previous investigations, particularly analytical data. Site-specific analytical data may help guide further sampling, provide data to test site hypotheses, and evaluate threats to:

- Drinking water wells by migration of hazardous substances to ground water;
- Drinking water intakes by migration of hazardous substances to surface water;
- Fisheries and sensitive environments by migration of hazardous substances to surface water;
- Residents, students, and sensitive environments by soil contamination; and
- Populations and sensitive environments by migration of hazardous substances to air.

The SI investigator may need to update or reevaluate the basis of the screening decision for certain sites, for example, at sites with a PA not based on the revised HRS and at certain sites with an SI completed before 1989 where no decision has been made. Approximately 40 to 100 additional hours may be needed to:

- Gather the information necessary to update the PA evaluation.
- Formulate hypotheses regarding projected hazardous substance releases and targets suspected to be exposed to actual contamination.
- Document the findings in a narrative report and scoresheets (or deliverables specified by the Region or State).

The investigator should develop SI plans if the site warrants an SI (i.e., site score is greater than or equal to 28.50).

Organize Project Team and Develop Plans

After reviewing the assignment and the site data, the project team should be organized. A project team consists of administrative, scientific, technical, and field personnel with specific responsibilities contained in the plans. The team includes the project manager, field sampling personnel, health and safety officer, chemist, geologist, and subcontract administrator, among others. The project manager, generally referred to as the SI investigator in this guidance document, coordinates all project activities. This includes directing planning activities, managing day-to-day SI tasks, and ensuring that all field activities are documented. The field team supports plan development prior to conducting site work, as well as reconnaissance and field preparation activities. Upon completing field work, the team documents all field activities.

Most SI field teams require a minimum of four persons, including the health and safety officer, chemist, geologist, and subcontract administrator. The health and safety officer prepares the health and safety plan, ensures staff certification, reviews safety equipment checklists, and monitors health and safety procedures during the SI. The chemist performs field screening, recommends analytical services, and interprets and validates analytical data. The geologist evaluates hydrogeological information, interprets other geological data, and supervises geophysical activities. The subcontract administrator prepares bid specifications and procures and schedules special analytical services, drilling operations, and data validation contracts.

After evaluating previous results and all other pertinent information, the SI investigator prepares four plans to document SI procedures:

- Work plan
- Sample plan
- Health and safety plan
- IDW management plan

These plans ensure thorough planning before field activities begin. Clear and concise plans are prerequisites for obtaining quality analytical data and making reliable conclusions.

The design of the work plan and sample plan is based on the objectives of the SI and HRS requirements. The sample plan includes justification for proposed sample locations and explicit instructions for sample collection. Health and safety plans describe procedures to protect workers according to specific standard operating procedures (SOPs). An IDW management plan is prepared in accordance with *Management of Investigation-Derived Wastes During Site Inspections* (OERR Directive 9345.3-02).

Chapter 3 of this document provides a detailed discussion of SI planning.

Perform Field Work

SI field work involves site reconnaissance, field observations and measurements, sampling, and health and safety monitoring.

A site reconnaissance (see Section 3.7) is conducted before field work begins to examine site and source conditions and to verify the practicality of sample locations. Sample analysis should be scheduled before field work begins.

SI field work typically takes two to six days. Typical field activities include: 1) completing field observations and site and pathway sketches that accurately identify sample locations; 2) locating and measuring distances to targets; 3) evaluating populations near the site; 4) collecting samples of source materials at the site and environmental media that may impact human and environmental receptors; 5) completing decontamination procedures; and packaging and shipping samples to the laboratory for analysis. Field work may take longer for very large sites, sites with several sources, or expanded SI sites requiring installation of ground water monitoring wells. Chapter 4 discusses sampling strategies for the focused SI and expanded SI.

Evaluate Data

The investigator should assemble and summarize all data to evaluate the site. SI sample results should allow the investigator to evaluate:

- Site and source characteristics;
- Presence of contamination for specific HRS pathways; and
- Targets actually or potentially exposed to contamination for specific HRS pathways.

Chapter 5 discusses evaluating SI data.

Per Regional and State instructions, an HRS score is developed after the site data are evaluated. Three types of scoring tools are available: EPA's *PREscore* computer program; SI worksheets; and other evaluation tools developed by EPA Regional or State offices.

The investigator must prepare a narrative report highlighting significant findings, including the history and nature of waste handling at the site, known hazardous substances, pathways of concern for these substances, and the impact on human and environmental targets.

Other deliverables, as directed by EPA Regional or State officials, may include a summary record of the SI data (see Appendix B). Chapter 6 discusses SI reporting requirements.

Based on the conclusions of the SI, EPA makes one of three site decisions:

- Site evaluation accomplished (SEA);
- Further investigation; or
- Schedule preparation of the HRS package if all necessary data are available.